

Effect of Specimen Thickness on Probability Distribution of Grown Crack Size in Magnesium Alloys

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Abstract : The fatigue crack growth is stochastic because of the fatigue behavior having an uncertainty and a randomness. Therefore, it is necessary to determine the probability distribution of a grown crack size at a specific fatigue crack propagation life for maintenance of structure as well as reliability estimation. The essential purpose of this study is to present the good probability distribution fit for the grown crack size at a specified fatigue life in a rolled magnesium alloy under different specimen thickness conditions. Fatigue crack propagation experiments are carried out in laboratory air under three conditions of specimen thickness using AZ31 to investigate a stochastic crack growth behavior. The goodness-of-fit test for probability distribution of a grown crack size under different specimen thickness conditions is performed by Anderson-Darling test. The effect of a specimen thickness on variability of a grown crack size is also investigated.

Keywords : crack size, fatigue crack propagation, magnesium alloys, probability distribution, specimen thickness

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